

may we not ask, why does a scientific man occupy time and attention in experimenting on it? The experiments recorded in this Journal were made with "the exudate from the lungs of animals which had been slaughtered on account of pleuro-pneumonia." It was assumed that the virus of the disease was present in this exudate. We should like to know on what evidence this assumption is based. We believe that the virus of the disease is given out in the breath, and is not found in any of the secretions; and that none remains, or can be generated in the system, after death. We have deduced this conclusion from our own experiments; and, according to our interpretation, the experiments upon which Prof. Brown's paper is based support the same view. Every competent authority now believes that the virus of contagious pleuro-pneumonia is communicated by a living diseased to a living healthy animal. If the virus could be communicated in any other way into the respiratory passages, there is every reason for thinking that the disease would be produced. If the virus got even into the blood, there is no known reason for thinking that it would not reach the lungs and produce the disease. When the Professor states that he failed to produce the disease with the exudate from diseased lungs, there is some ground for doubting that the exudate contained the virus, and that the title of his paper—"Observations on inoculation with the virus of contagious pleuro-pneumonia"—is questionable, to say the least of it.

We have next to notice Dr. Voelcker's paper entitled "Field Experiments on Pasture Land." We begin by remarking that it is more like the production of a tyro than of a man of well-earned reputation. Some eight or nine years ago Dr. Voelcker suggested to his former pupils and others a series of experiments for testing the efficacy of different manures. In the paper to which we invite attention, the result of one series of these experiments is given. Dr. Voelcker did not superintend any of these experiments. They were made in different parts of the country, by men who, we presume, possess more than average fitness for describing their own experiments. It is most desirable that experiments of this kind should be carried out on different soils and in different circumstances; and, so far, the scheme set on foot by Dr. Voelcker deserves our highest praise. It is to the execution of the scheme, and to his own report in particular, that we object. The experiments were made at four different places. We are not furnished with the analysis of the soil at any of these places. Among the manures experimented with were mineral superphosphates, Peruvian guano, crude potash salts, bone-dust, &c. It is notorious that superphosphate varies greatly in composition. It is equally well known that of late years Peruvian guano has varied greatly in quality. No man knows this better than Dr. Voelcker, and yet in the report under review he does not give the analysis of a single manure used in these experiments. Under these circumstances we submit that false conclusions are liable to be deduced from the results. This sort of work is not science, and we call upon the governing body of the Royal Agricultural Society of England to put an end to it. When we examine with care the tables and the conclusions sought to be drawn from them by Dr. Voelcker, we see additional grounds for offering this suggestion. Every farmer of experience

knows that the quality of the soil varies exceedingly, not only on the same farm, but in different parts of the same field. Experimental ground should, therefore, be treated with the greatest care. In most cases it will be necessary to prepare it in a variety of ways. The writer has a piece of ground under experiment which he manipulated with the utmost care. It was dug to a uniform depth, inequalities of surface and of soil removed by levelling and mixing, and repeated crops of grain raised without any manure before any experiment was made. No such care appears to have been considered necessary in undertaking the experiments on which Dr. Voelcker reports. The tables bear out our view fully, as we shall briefly show. In each place ten plots were laid out for experiment, and two of the ten (Nos. 5 and 10) were left unmanured. In page 431 we are favoured with the result of one set of these experiments, and we take from it the following figures:—

Plot.	Manure.	Yield of grass per acre.		
		Tons.	qrs.	lbs.
5	No manure ...	...	4	2 1
8	Crude potash salts ...	...	3	3 6
10	No manure ...	...	3	3 26

Dr. Voelcker concludes from these figures that crude potash salts diminished the produce. Now, in looking at the figures we find a greater difference between the two unmanured plots than between the one to which potash was applied and either of the others. Assuming that this difference arose from difference of soil, what guarantee have we that the crude potash salts were not applied to a soil inferior to either of the two unmanured plots?

We take another illustration of our argument from the table, page 432:—

Plot.	Manure.	Weight of grass per acre.		
		Tons.	cwt.	lbs.
3	Fine bone-dust ...	...	4	13 0
4	Mineral superphosphates and crude potash salts ...	...	3	19 4
5	No manure ...	...	2	17 2
6	Common salt ...	...	3	18 2
8	Crude potash salts ...	...	5	4 0
10	No manure ...	...	4	0 4

Here we have the difference between the two unmanured plots greater than the difference between one of them (No. 10) and any of the manures named.

The weight of grass from common salt was more than that from one of the unmanured plots, and less than that from the other. On which are we to rely in coming to a conclusion as to the action of common salt on the land of the experimenter? And, again, are we to conclude that while bone-dust increased the produce above either of the unmanured plots, and while crude potash salts increased it still higher, a mixture composed of superphosphate and crude potash salts produced less than an unmanured plot?

#### COOKE'S "FUNGI"

*Fungi: their Nature, Influence, and Uses.* By M. C. Cooke, M.A., LL.D. Edited by the Rev. M. J. Berkeley, M.A., F.L.S.—The International Scientific Series, vol. xiv. (London: Henry S. King and Co., 1875.)

THE names both of Dr. Cooke and Mr. Berkeley appear on the title-page of this work, but in the editor's preface it is stated that the whole of the manu-

script was prepared by Dr. Cooke. There is very much that is interesting in this volume, but upon the whole the book is a disappointing one. The editor states that the work is intended for students, but we fear that the junior student will be repelled rather than attracted by the hosts of scientific names of genera and species which crowd many of the pages with italics. Then we cannot but condemn the mode of arrangement of the contents.

The mode of division of the work renders it quite impossible for the reader to obtain any connected account of the life-history of one single species. This we consider a very grave defect indeed. To trace the life-history of one form we may have to refer to the chapters on the "Structure," "Germination and Growth," "Sexual Reproduction," and "Polymorphism" before we can obtain what we want. This ought not to be, and we venture to think Dr. Cooke would have rendered his book much more useful if he had given connected life-histories of the most interesting and best known forms.

Some of the omissions have rather surprised us. For example, we do not find any account of the yeast plant, a form which most students of biology will do well to study carefully. The rather meagre index does not contain the words "Yeast," "Torula," "Hormiscium," or "Saccharomyces," although the word "yeast" occurs in the first chapter. Then there is no account of the life-history of the ergot of rye. Its life-history is perfectly well known, and most students, whether medical or not, ought to have some knowledge of it.

The book is evidently the work of a systematic rather than a morphological botanist, and this may account for some of the errors that have been made. For example, the process of conjugation and formation of zygospores in the *Mucor* is quite correctly described, but in what way can Dr. Cooke apply the term conjugation to the fertilisation of the oogonium by the antheridium in *Achlya* and *Peronospora* as figured on pages 169 and 171? The formation of the ascogonium of *Eurotium Aspergillus-glaucus* is only slightly indicated on p. 189, while the pollinodium is altogether omitted. The classification is that given in Cooke's "Handbook," but, for the use of the student, we do not think it equal to that given in Grisebach and Reinke's translation of Oersted's "System der Pilze," &c.

The Lichen-theory also receives a share of attention; Schwendener and his followers are condemned for the "sensational romance of lichenology," as it has been called. Truth, however, is often stranger than fiction; and if anyone would take the commonest lichen he can find and give botanists a complete account of its life-history, he would earn the gratitude not only of all algologists, fungologists, and lichenologists, but of botanists generally.

The chapters on the "Uses," "Notable Phenomena," "Influences and Effects," "Habitats," "Cultivation," "Geographical Distribution," and "Collection and Preservation," are very valuable; and if the other chapters had been run together into connected life-histories, we think the work would have been an admirable one. As it is, it cannot fail to interest and instruct, and every page bears evidence of the extensive and accurate knowledge of the author. The freedom from errors of the press in the names of the fungi shows the care with which the

work has been revised and edited. The illustrations are numerous and good, but there are a few old faces among them whose absence would not have greatly grieved us.

#### MM. H. AND E. MILNE-EDWARDS'S NEW WORK ON MAMMALS

*Recherches pour servir à l'histoire naturelle des Mammifères comprenant des considérations sur la classification de ces animaux*: par M. H. Milne-Edwards: *des observations sur l'hippopotame de Sibéria et des études sur la Faune de la Chine et du Tibet Oriental*: par M. Alphonse Milne-Edwards. Two vols. 4to., text and plates. (Paris: G. Masson, 1868-74.)

LAST year we called our readers' attention to the zoological researches lately made in the Tibeto-Chinese province of Moupin, by the French traveller, Armand David,\* and to the particular importance of his discoveries in the class of Mammals. The work now before us gives a complete account of the many new forms the knowledge of which we owe to the energy of this excellent traveller and naturalist, besides other important contributions to the history of the same class of animals.

The work commences with an essay by the veteran zoologist, M. H. Milne-Edwards, upon the general classification of Mammals. The system here propounded, which has many good points, and embraces details already put forward by the author in previous writings, is not one that we think will meet with very general approval. Its chief feature is the elevation of the marine or pisciform Mammals (containing the two orders of Sirenians and Cetaceans) to a second sub-class equivalent in value to the normal Mammals on the one hand and to the Marsupials on the other, and the degradation of the Monotremes to a mere subdivision of the latter. Prof. Huxley's views as to the relative position of these groups, not to speak of his general arrangement of the class, appear to us to be much more easily justifiable.

The main body of the work consists of three memoirs by M. Alphonse Milne-Edwards, a worthy son of his distinguished father, illustrated by a long series of well-executed plates, which constitute the second volume. The first of these memoirs contains observations upon the hippopotamus of Liberia—a smaller form of the animal now so well known to us from the exhibition of living specimens in the Zoological Society's Gardens, and in other collections. First described in America in 1844, the smaller hippopotamus remained entirely unknown in Europe until within the last few years, when specimens were procured for the Jardin des Plantes by the exertions of Prince Napoleon when Minister of the Colonies. The figure now given by M. Milne-Edwards is the first that has been published of the entire animal, and the general skeleton is likewise now for the first time described, only the cranium having been known to the American naturalists.

M. Alphonse Milne-Edwards's second essay is entitled "Études pour servir à l'histoire de la Faune Mammalogique de la Chine," and is based upon collections trans-

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